

## C L A I M S

What is claimed and desired to be secured by Letters Patent is as follows:

1. A closure for setting engagement with a structural member and comprising:
  - (a) a substantially cylindrical body having an outer cylindrical surface relative to a central closure axis;
  - (b) a substantially continuous guide and advancement flange extending helically about said outer cylindrical surface, said flange having a leading surface and a trailing surface relative to a direction of forward advancement;
  - (c) at least one of said leading surface or said trailing surface being compound in contour and including an inward facing anti-splay surface component facing generally toward said closure axis; and

(d) said body having a multi-surface aperture formed therein that is aligned with said closure axis and that is elongated along said closure axis, said aperture opening onto a trailing surface of said body and including a plurality of circumferentially spaced, centrally facing surfaces extending substantially parallel to said closure axis that are aligned to form a removal socket adapted to receive a removal tool.

2. The closure as set forth in Claim 1 wherein said multi-surfaced aperture includes:

(a) a multi-lobular aperture elongated along said closure axis, said aperture including a plurality of circumferentially spaced lobes extending substantially parallel to said closure axis and facing generally toward said closure axis.

3. The closure as set forth in Claim 2 wherein:

(a) said lobes circumferentially alternate with grooves extending substantially parallel to said closure axis.

4. The closure as set forth in Claim 1 and including:
- (a) said body having a forward end relative to said forward advancement direction; and
  - (b) said body having a V-shaped set ring formed on said forward end to enhance setting engagement of said body into a surface of a structural member.

5. The closure as set forth in Claim 1 in combination with a bone implant screw adapted for connection to a bone fixation structural member, said bone implant screw including:
- (a) a threaded shank adapted for threaded implanting into a bone;
  - (b) an open head formed by a pair of spaced apart arms having mutually facing channel surfaces defining a structural member receiving channel to receive a bone fixation structural member; and
  - (c) said mutually facing channel surfaces having respective mating guide and advancement structures formed therein which are compatible with and rotatably mateable with said guide and advancement flange to enable guiding and advancement of said body into said channel to thereby clamp said bone fixation structural member therein and to interlock said body and arms.

6. The closure and bone implant screw combination as set forth in Claim 6 wherein:
- (a) said mating guide and advancement structures of said bone implant screw include an outward anti-splay surface component which cooperates with said inward anti-splay surface component of said closure in such a manner as to resist a tendency of said arms to splay in reaction to torquing said closure into engagement with said bone fixation structural member.
7. The combination as set forth in Claim 6 wherein:
- (a) said guide and advancement flange has a relatively enlarged region near an outer periphery thereof that forms said inward anti-splay surface component;
  - (b) said mating guide and advancement structures are contoured in a complementary manner to said guide and advancement flange to form said outward anti-splay surface component; and
  - (c) said inward anti-splay surface component engages said outward anti-splay surface component when said closure is guided and advanced into said open screw head of said bone implant screw so as to

interlock said body to said arms to resist  
radially outward splaying movement of said arms.

8. The closure according to Claim 1 wherein:
  - (a) said multi-surfaced aperture is hexagonal in cross section.
9. The closure according to Claim 1 wherein:
  - (a) said multi-surfaced aperture passes entirely through said body from said trailing surface to said leading surface.
10. The closure according to Claim 1 wherein:
  - (a) said multi-surfaced aperture passes only partially through said body from said trailing surface.
11. A closure for setting engagement with a structural member and comprising:
  - (a) a substantially cylindrical body having an outer cylindrical surface relative to a central closure axis;
  - (b) a guide and advancement flange extending helically about said outer cylindrical surface, said flange

having a trailing surface relative to said forward advancement direction;

- (c) said trailing surface being compound in contour and including an inward facing anti-splay surface component facing generally toward said closure axis; and
- (d) said body having a multi-lobular aperture formed therein which is aligned on and elongated along said closure axis, said aperture including a plurality of circumferentially spaced lobes extending substantially parallel to said closure axis and said lobes circumferentially alternating with bore grooves extending substantially parallel to said closure axis to form a removal socket adapted to receive a removal tool.

12. The closure as set forth in Claim 11 and including:

- (a) said body having a forward end relative to a direction of forward advancement; and
- (b) said body having a V-shaped set ring formed on said forward end to enhance setting engagement of said body into a surface of a structural member.

13. The closure as set forth in Claim 11 in combination with a bone implant screw adapted for connection to a bone fixation structural member, said bone implant screw including:
- (a) a threaded shank adapted for threaded implanting into a bone;
  - (b) an open head formed by a pair of spaced apart arms having mutually facing channel surfaces defining a structural member receiving channel to receive a bone fixation structural member; and
  - (c) said mutually facing channel surfaces having an internal mating guide and advancement structures formed therein which are compatible for slidably mating with said flange upon rotation of said body to enable advancement of said body into said channel to thereby clamp said bone fixation structural member therein and to interlock said body to said arms to resist splaying of said arms.



14. The closure and bone implant screw combination as set forth in Claim 13 wherein:
- (a) said mating guide and advancement structures of said bone implant screw include an outward anti-splay surface component which cooperates with said inward anti-splay surface component of said flange in such a manner as to resist splaying of said arms.
15. The combination as set forth in Claim 14 wherein:
- (a) said flange has a relatively enlarged region near an outer periphery thereof that forms said inward anti-splay surface component;
  - (b) said mating guide and advancement structures are contoured in a complementary manner to said flange to form said outward anti-splay surface component; and
  - (c) said inward anti-splay surface component engages said outward anti-splay surface component when said closure is rotated into said open screw head of said bone implant screw.

16. A closure for setting engagement with a structural member and including a substantially cylindrical body having an outer cylindrical surface relative to a central closure axis and a substantially continuous guide and advancement flange extending helically about said outer cylindrical surface, said flange having a leading surface and a trailing surface relative to a direction of forward advancement, the improvement comprising:

- (a) at least one of said leading surface and said trailing surface being compound in contour and including an inward facing anti-splay surface component facing generally toward said closure axis; and
- (b) said body having a multi-surfaced aperture formed therein which is located and elongated along said closure axis, said aperture including a plurality of circumferentially spaced surfaces extending substantially parallel to said closure axis so as to form a removal socket adapted to receive a removal tool.

17. The closure as set forth in Claim 16 wherein said multi-surfaced aperture is:
- (a) a multi-lobular aperture elongated along said closure axis, said aperture including a plurality of circumferentially spaced lobes extending substantially parallel to said closure axis and said lobes circumferentially alternating with grooves extending substantially parallel to said closure axis.
18. The closure as set forth in Claim 16 and including:
- (a) said body having a forward end relative to said direction of forward advancement; and
  - (b) said body having a V-shaped set ring formed on said forward end to enhance setting engagement of said body into a surface of such a structural member.
19. The closure as set forth in Claim 16 in combination with a bone implant screw adapted for connection to a bone fixation structural member, said bone implant screw including:
- (a) a threaded shank adapted for threaded implanting into a bone;

- (b) an open head formed by a pair of spaced apart arms having mutually facing channel surfaces defining a structural member receiving channel to receive a bone fixation structural member;
- (c) said mutually facing channel surfaces having respective mating guide and advancement structures formed therein which are compatible to allow rotational mating with said guide and advancement flange to enable guiding and advancement of said body into said channel to thereby clamp said bone fixation structural member therein and to interlock said arms to said body to resist splaying of said arms; and
- (d) said mating guide and advancement structures of said bone implant screw including an outward anti-splay surface component which cooperates with said inward anti-splay surface component of said flange in such a manner as to resist a tendency of said arms to splay in reaction to torquing and other forces.

20. The combination as set forth in Claim 19 wherein:

- (a) said guide and advancement flange has a relatively enlarged region near an outer periphery thereof that forms said inward anti-splay surface component;
- (b) said mating guide and advancement structures are contoured in a complementary manner to said guide and advancement flange to form said outward anti-splay surface component; and
- (c) said inward anti-splay surface component engages said outward anti-splay surface component when said closure is guided and advanced into said open screw head of said bone implant screw so as to radially interlock.